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AUTHOR Tawney, James W.
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ABSTRACT

The paper addresses the future status of education, with particular attention to microcomputer uses in special educaion. An analysis of public education in contemporary society suggests that in the near future children will be educated at home by their parents with the help of computers and telecommunication systems. The author cites economic reasons for the projected downfall of public education, discusses the practical value of computers in special education, and outlines an approach to maximizing benefits in terms of management and instruction. The conclusion of the paper describes the life of a family in the year 2100 and suggests the impact of changing lifestyles on home intervention for severely handicapped infants. Intervention might include use of an "electronic crib" to record data and provide stimulation. As the child grows, an extended "family" might provide assistance and support. (CL)

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Education: A Look to the Future

James W. Tawney

Professor of Special Education

Division of Special Education and Communication Disorders

The Pennsylvania State University

219 More Building

University Park, PA 16802

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It's always a pleasure to talk about the future, computers and the education of handicapped students. I look forward to such opportunities with a degree of enthusiasm that is tempered only by the reality that future events will probably discredit much of what I have to say. Nevertheless, since accountability comes very far down the road--particularly if one's projections are cast into the 21st century--my enthusiasm is not unduly diminished.

Today, I will address three topics:

(a) the status of public education in contemporary society;

(b) the status of microcomputer uses in special education; and

(c) potential uses of technology in a future society.

You may not like some of what I have to say. In fact, you may take great exception to the assumptions I've made, and thus to some of my projections. So, before I address the first of the topics, let me explain briefly how those were developed.

First, I have been confronting the topics since 1980, when Pat Cegelka and Herb Prehm asked me to write a chapter on futurism for their new text on Mental Retardation (Cegelka and Prehm, 1982). At the same time, I was developing a similar manuscript for a text in severe mental retardation. Both were based on work which had recently been completed at the University of Kentucky--developing a prototype telecommunication system to control learning devices (teaching machines) placed in the homes of handicapped children but controlled from a microcomputer in a central location--our Programmed Environments preschool. That system was described earlier (Tawney, 1977), in an attempt to show how education, health, and social service delivery

could be improved through new models designed around telecommunications technology. Thus, it appeared that I had a good start on the writing tasks at hand. However, about this time Alvin Toffler's book The Third Wave was published. I attained a copy, and read it quickly, from cover to cover. That experience was both a blessing and a curse. On one hand, it was highly reinforcing to read about an "electronic cottage" after our experience with home-placed teaching machines. On the other, when talking about prosumerism, Toffler made the point clearly that the technology revolution would have major impact on the world economy--a factor I had ignored in my telecommunications based novel.

Reading The Third Wave actually forced my attention to two problems: our troublesome economy and, given what the future may hold for us, the place that the mentally retarded have in a radically changed society. My task became, then, to create my own scenario, or view, of the future, and then to explore ways the retarded may become functional contributing members in that future culture. I should tell you, up front, that the professional "literature" in special education has played no part at all in the design of a future culture. Instead, I have looked elsewhere. I looked to the new releases in our local bookstore--to see what economists were writing for the general public. I have carefully observed my middle class, middle income friends and colleagues trying to deal with inflation and then deep recession. During this time I've criss-crossed the country by car, from Pennsylvania to California by the southern route, then back home across Interstate 80; then from Pennsylvania to Michigan to Nebraska, and

through the grain belt--all the while asking myself "Will advanced technology really transform this culture or that geographical region?" I've read or reread other's visions of Utopia. In Arizona, I've stopped to visit Arcosanti, Paulo Soleri's vision of a city of the future. It is, as some of you may know, a rather humble beginning, a small enclave located on the edge of a mesa.

It is clear to me now, that we are experiencing the transformation to a high technology society--as Alvin Toffler proposes. It is less clear that this technology explosion will impact on a high percent of the population of the United States. For, while technology development proceeds at a rapid pace on the East and West coasts, and thus creates a demand for even more technology development, life proceeds differently in other parts of the country, and in other economies. It is clear to me at least that technology will have major impact on the lives of handicapped persons, but, in order to see that potential, it is necessary to look beyond the trivial uses that "are" the technology of today. After all, the world may be ready for a new car that tells you "all monitored systems are operational" but do we really need one? And, does anyone but Pacman really need Ms. Pacman, the newest video game?

I believe that our society is undergoing major transformation, that this transformation will radically alter public education, and that this revolution will have positive and negative effects on the handicapped. The task that confronts educators and social planners is to insure that the balance is tipped in a positive direction.

PUBLIC EDUCATION IN CONTEMPORARY SOCIETY

I believe we are witnessing the beginning of the end of public education. Those of you who are undergraduates are probably not the last generation to be trained, but you may be the next-to-last generation. Those of you who are mid-career may look forward to continued employment until retirement. But, by the year 2100, public education as we know it now may have disappeared--except for services to children who are difficult to teach or difficult to manage.

If there is no system of public education, what will take its place? How will children be educated? Briefly, for now, children will be educated at home, by their parents. Computers and telecommunications systems will play a large part in the educational process.

Now, you may be asking, "Do I really believe this will occur, or am I just trying to get your attention?" I am quite serious. As I observe the world around me, this seems to be a very real possibility.

But why? What could possibly destroy a major social institution? There are perhaps many reasons; I will briefly list a few. First, there is already a trend from public to private education, in urban areas where the issues of race, or great differences in economic status trigger such movement. Enrollments in prep schools are on the upswing. Those who value education, and who can afford it, are abandoning the public education system in increasing numbers.

The major reason, as I see it, is that our culture can no longer afford a public education system. If nothing else, we are a society that expects something for nothing. I point to the size of our growing

federal deficits to document that assumption. During our last presidential election the message from the voters was clear "We can't afford to pay any more taxes." As we watch the current budget fights, we will see if that message has been forgotten.

My objective here is not to shift into a discussion of economic policy, but to focus on the realities of our economic crises. To do that, and still be brief, let me tell you about a little game we play in one of my courses. It's called "What ever happened to the Great American Dream?" Generally, the "Dream" is defined as owning a modest though comfortable home and two cars; having money for leisure time activities, and enough put by for a college education for the two children in the "average" family. Once we define it, then we guess at the annual income needed to sustain the dream. We get some good guesses--first in the $20,000-30,000 a year range--but my best guess, in 1983, is that it requires about $65,000 a year, for an average family in an urban area. Now, that may seem high to you, if you've had a home for 10 years or so and think you will reasonably be able to send your two children to college. But, think of the cost to a young couple, attempting to buy a house in today's market. Then, realize that at current interest rates, only 1 out of 10 people can afford a home. Then, compare that annual income to the percent of people in the country who actually earn that amount of money. Then, compare the $65,000 to the salary for a beginning teacher. Now, as a society, we can't afford to pay more, but that teacher can't afford to live on less--achieve some semblance of the dream. That's the Catch-22. Earlier this year, when we talk of a trillion dollar deficit,

and a massive defense budget, it was clear we had not come to terms with economic reality or social priorities. For the moment, we can only wait and see.

Next, public education suffers from an image problem. No matter how proud a local community may be of its schools, on a national level, there is a general attitude that public education is an ineffective institution. Those of us in special education who work in colleges and universities are experiencing a reordering of federal priorities, to define, then increase the quality of our training programs. At the state level, one can look around the country and point to the competency testing movement as a reaction to the belief that our high school graduates lack basic skills. The "back to basics" movement, too, is an effort to define and then teach something concrete. Can public education solve its image problem? Possibly, but I doubt that it will. Perhaps we can look to the auto industry for some directions. Let me explain. Recently, a colleague and I were discussing Chrysler Corporation's turnaround, after the announcement of its first recent profitable quarter. My colleague made two comments "I never thought they'd make it. I wonder how they did." My response to his second statement went something like this. "There are two reasons; contrast the message implied in their five year, 50,000 mile warranty to the number of recalls that Ford and GM have experienced." Interestingly, last Monday's Washington Post (April 18, 1983, Washington Business section) had an article on that very topic. Did you know the reason why you don't see many of the new Mustang convertibles in that they're being recalled almost as fast as they're being made. The top rips when

you put it down. Did you know that federal agencies have issued 2,395,000 recall notices so far this year? Or that one of the two major companies has issued as many as 5,000,000 recall notices because the rear axle may fall off of one of its models. Or, that nearly a half million Chevettes and similar series cars have been recalled because of a fule line problem that causes engine fires. Or that there aren't enough of the parts (which cost a dollar) to fix the problem. It seems that the automobile industry has not yet come to grips with a strategy to counter foreign competition. Will Ford and GM look to Chrysler as a model for success? Will our national automobile industry survive/ Will public education survive? We don't face foreign competition. But, perhaps, we face a new attitude from parents--"If I can't afford it, I'll do it myself." That's what Alvin Toffler means when he talks about <u>prosumerism</u>. In the face of economic adversity, we can survive by producing and consuming our own products, or by doing for ourselves those things we once paid others to do.

To summarize this analysis of the status of contemporary public education:

(1) the profession faces some difficult problems;

(2) public education, as we know it, may not survive;

(3) the alternative form of education which may emerge will be centered in the home; microcomputers and telecommunication systems may play a major role in this new form of education;

(4) there are powerful factors working toward a transformation of public education; transformation to a high technology society; world-wide, as well as national economic crisis;

inability, as a society, to come to grips with economic realities and social priorities.

Before I go on, let me share some observations--in the form of answers to questions you may have. First, do I think this should happen? My answer, from the perspective of an observer of events, is "This is what I believe will happen." Then, "Will this transformation be good or bad for children?" My response, "It will be both, but mainly, it will just be different."

THE STATUS OF MICROCOMPUTERS IN SPECIAL EDUCATION

This status report is actually divided into two parts: (1) what's happening now and (2) what you could do with a microcomputer, if you have only limited access to one.

Once again, the car will serve as an analogy. Going back to my youth, the impact of microcomputers today is much like Saturday night in the back seat of a '55 Chevy--lots of talk and very little action.

If there is one word that best describes our view of microcomputers in education, that word is hesitant. There are many reasons for this hesitancy. Some are:

1. We know a computer when we see one, but we don't know what it can do.
2. Cost--while today, with a manufacturer's rebate, you can buy one "real" computer for under $50.00; a functional home educational system (computer, monitor, 2-disk drives and miscellaneous connectors) will cost just under $3,000.
3. Immediate obsolescence--advances are occurring so rapidly that the computer you buy today will be obsolete tomorrow.

4. The cost of placing enough computers in the school so that every child has adequate access to one.

5. The discrepancy between hardware and software development.

6. The drill and practice mentality of software developers.

Given that, despite the fanfare, computer usage is developing slowly, exactly what is happening--now. To answer that, I should tell you that my associates at Penn State and I are just initiating a project to develop a computer assisted instruction program titled "Technology Applications for Handicapped Persons." That project is in its initial stages, and my impressions are very general at the moment. However, by September we should have an extensive information base. So, this is what I think is happening; or will happen soon.

1. Over the next five years, public schools will purchase computers, to the maximum extent that their budgets will allow.

2. Since anyone with a computer, two disc drives, and an author program can create "software," many people will. However, 99% of that software will only be distributed locally, in the same way that most teacher-made curriculum guides are used locally, and not distributed commerically, on a national basis.

3. There are a few little known but major collaborative efforts between curriculum publishers and computer companies to translate the regular elementary and secondary curriculum to computer assisted instruction programs.

4. There are a few national projects, e.g., the Microsift

project at the Northwest Regional Lab, that are attempting to identify and evaluate the current explosion of software.

5. There are a limited number of federally funded projects that act as information collection and distribution centers for computer usage. For example, our university participates in an electronic mail system called Special Net. It contains many unique information bulletin boards, including a new one called SLATE, which is managed by a DC area consulting firm, Education Turnkey Systems. It collects and "publishes" information on a variety of topics related to the use of microcomputers in the schools.
6. There are currently a few, low budget technology assessment projects funded by the Department of Education--Special Education Programs. These projects have just been funded, and most will start on July 1.

These are fairly broad scale efforts. You will note that none of them address the potential of computers with specific handicapped groups. For example, it might be interesting to determine if "EMR" students learn to program a computer in BASIC or LOGO any slower or faster than so-called normal students. Such an effort may be underway somewhere in the country, but it has not yet come to my attention. At the same time, to the best of my knowledge, there has yet been no concerted effort to bring together experts in learning, in curriculum development, and computers, to explore novel ways to develop interesting programs.

What could you do if you were given a computer for your special

class or resource room? My first priority would be to use it as a data storage system for my students' individual, daily performance records. Tomorrow, I will describe a system for parents to use, to analyze the instructional process. A key component of that system focuses on the question, Where are the data? Or, Show me that my child is learning. As you are aware, one of the unique problems of special education is its inability to document that it is effective. Not that it isn't, its just that the field has not developed an effective way to (a) teach precisely, on an individualized basis, (b) document the effects of instruction, and (c) make data based curriculum changes. So, I would set up a data file on each student. I would encourage students to enter their own data, and help other students who may not initially have that skill. I would look for a software program that displays child performance daily, and using a system of decision rules such as those incorporated in precision teaching and direct instruction techniques, I would consult with the student when there is no progress for three days.

This strategy may seem quite mundane to you, but it has these benefits:

1. it may create a data base where none now exists;
2. it provides adept students the opportunity to manage part of their instructional program;
3. it creates an opportunity for students to learn new skills, then teach them to others;
4. it involves the student and teacher in a unique form of dialogue, as they cooperatively plan and modify the instructional

program;

5. it may accelerate student performance, if the data show progress and a high degree of success;
6. it frees the teacher from one management task; or it adds an element to the instructional process at little response cost to the teacher;
7. to the extent that students show they are learning, individual parents may become strong supporters of the teacher and the instructional program; and
8. to the extent that the teacher, student, and parents use the data as a basis for program change, parent involvement in the IEP process will reach the level that Congress intended when P.L. 94-142 was passed.

The next thing I would do is buy some computer games and use the computers as a contingent reinforcer. I might also buy a copy of Homme's book "How to Use Contingency Contracting in the Classroom" and use it to develop a systematic plan for using access to the computer to increase students' performance in the school subjects that are least reinforcing for them.

Next, I would look for the computer wizards among the elementary and secondary students, and I would offer them some type of incentive to work with my students--to teach them how to program the computer. Then I would sit back and watch what they produce.

Next, I would look very carefully at any existing software courses or lessons being considered for purchase. Of the many questions one might ask,these would guide my decision-making:

1. Has the developer transformed the same material from print to screen? If so, is there any fundamental difference between the book form and the software package?
2. Will the program do something different than you as a teacher might do? If not, is it worth the price? If so, what are the critical features that might enhance learning?

I hope you understand that these mundane uses and basic questions are presented in a way that is intended to encourage you to look at the microcomputer as another instructional tool. While I believe it to be a powerful and potentially effective tool, there are many problems yet to be solved. There is a great deal of research that needs to be conducted, and most of all, there must be a major development thrust to decrease the discrepancy between hardware and software development. Having said that, I will move on to the next telecommunication systems in a future society.

2100 AND BEYOND

This view of the future is based on two major sources: (1) my previous work with home based, computer-controlled telecommunication systems and (2) concepts from Alving Toffler's book The Third Wave. This view is a variation of other, published versions, and is one of a series of constantly changing scenarios that, time and resources permitting, will evolve into a book length manuscript.

LIFE IN A FUTURE CULTURE

My objective is to describe life for an individual family in the year 2100, synthesizing Toffler's concepts to create a scenario which is, in my view, feasible. Elsewhere, I have elaborated on the

rationale for this and not another view. Here are, in brief, the most critical factors: (1) "prosumerism" seems the most likely excape from an inflation trap that has operated to strip the facade of affluence from a credit-dependent and cash-poor middle class; (2) the energy crisis has already altered the travel patterns of Americans and it appears that two-way video and computer communication systems have the potential to reduce the need to travel and thereby sharply reduce petroleum consumption; (3) home construction already reflects a shift to active and passive solar systems and to some extent, homes are designed to include greenhouses. The trend toward developing energy independent and food producing home environments has begun.

The major premise underlying this view of a future culture is that geographical redistribution of the population will occur. Cities and suburbs will be abandoned and people will move to (currently) less expensive areas where they may produce their own food. In the same way that many small manufacturers have relocated in the midwest, new communities may emerge within general proximity to new versions of industrial plants. In other locales, professionals with similar interest may create communities where they enjoy the climate or scenery, in the same way that, now, Santa Fe, and Taos have developed as artist colonies. These communities will be electronically linked to businesses located throughout the country. Words and data will be transmitted between home and office by cablesatellite systems and, in return, pay for work will be similarly transmitted. Homes in these communities will be dispersed on enough land to grow foods. Homes may contain greenhouses so that year-round production is possible. There may

be communal development projects, i.e., shrimp or fish farms that are maintained by shared labor. There may be shared systems that comprise ecological cycles, i.e., dairy farms, manned by shared labor, providing food for the community, farms that process manure into methane gas in a simple converter that then generates electricity sufficient for community needs.

Home design will evolve naturally from current innovations, new roof design to support active solar panels, modularized interconnected living spaces for extended family clusters, containing work and living areas. Computer control centers will monitor the environment to minimize energy use and to automatically carry out mundane tasks on preprogrammed schedules. A variety of remote computer terminals will perform several functions: learning for children, work for adults, and so on. Home entertainment centers using laser/holograph imagery may bring Broadway plays into the home, transmitted by cable and satellite from Broadway, or from artist centered communities, which evolve in various parts of the country.

Family life in this setting will be geared to the individual patterns of family members. One may work for pay early in the morning, transmit this product electronically, spend a few hours at work for consumption (gardening) and then enjoy leisure time. Another may work on quite the opposite schedule, a pattern that will permit shared parenting. Where there is a severely developmentally retarded family member, this more casual life style may ease the task of child rearing in many ways, described in the next section.

HOME INTERVENTION FOR A SEVERELY HANDICAPPED INFANT

This scenario begins with the birth of an infant who manifests severe and multiple handicapping conditions, although advances in pregnancy monitoring make it likely that these problems are known and advance preparation has begun before birth. A central agency will be informed of the birth of and a world-wide planning effort will be set into motion. Diagnostic information will be gathered and world-wide teams of specialists will be identified from a resource file. Cleft palate information may go to Paris, heart data may go to New York, and so on, transmitted by satellite within hours of birth. Critical information on the infant will enter several data banks simultaneously. A lifelong, longitudinal research and intervention process will have begun.

While the infant is still in the hospital it will be possible, through two-way video and satellite communication, to conduct a teleconference with a world body of experts who will develop a comprehensive intervention plan for the first few months of life. This plan will, through constant feedback, undergo modification and will form the basis of a long-range intervention plan. The first teleconference will provide experts with a comprehensive set of data on the infant's physical state and will elicit recommendations from experts for specific diagnostic testing. Should the infant manifest a rare syndrome, the central coordination agency will have retrieved, from several computer library storage systems, all that is currently known about the syndrome. When this data is compiled, when all diagnostic tests have been given and the results are obtained, the data will be transmitted to each team of experts.

While the infant is in the hospital, representatives from a coordinating agency will meet with the parents. Their basic objectives will be to present information, to link parents with support groups, and to obtain information about the physical properties of the home. The outcomes of the first meeting: parents will have complete information about their child; they will have the opportunity to talk with the other parents via teleconference and in person, at a time when they most need information and support; a range of educational intervention services will be described; and for the intervention team, general specifications for the design of the infant's home living/learning environment will be proposed.

The central service coordination agency, before the child leaves the hospital, will develop and install an "electronic crib" in the family home. To accomplish this, it may arrange for the loan or lease of data transmission systems for families that lack them, may install two-way communication systems, arrange for the loan of electronic toys, learning devices, and health monitoring systems. Based on the extensive diagnostic procedure, appropriate response recording systems will be selected.

When the electric crib is installed in the home, it will be linked to the family's home computer control system, as well as to external communications systems. If, for example, the infant requires a temperature and air controlled environment because its natural immunity system is impaired, the family computer control system can be reprogrammed to ensure that temperature remains within 1 degree of the defined setting. The electronic crib will contain multiple channel electronic cable

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connectors, so that several types of data can be recorded simultaneously. The crib will be spring loaded, so that it is motion sensitive, enabling continuous recording of the infant's activity cycles. Electronic sensors, e.g., a thin temperature tape, will provide data on fluctuations in the infant's temperature. Other channels will record the infant's responses to crib-placed learning devices which are changed rapidly as the infant matures. These data producing systems may be linked to the family computer storage system, or mini-memory systems may be installed so that data is recorded, compressed, or transmitted in high speed bursts, permitting a full days data to be transmitted to another location in milliseconds.

While the infant leaves the hospital for home, the structure for an extensive support system will be in place. It may be possible to avoid a prolonged hospital stay since environmental control and health monitoring systems can be transferred to the home. A fundamental concept in Toffler's view of the future, prosumerism, is that one learns to do things for him or herself. In the late 70's , home pregnancy testing kits enabled women to assume the function, that had until then, been the domain of the medical profession; and, similarly, blood pressure self-test kits were introduced into the mass market. In the same way, it will be possible for parents to monitor their infant's critical health functions. They may be taught certain tasks and observed directly in the hospital. Then, when the infant moves to the home, they may administer tests or take observations under the watchful eye of their pediatrician who observes for a minute or two via two-way video, gives feedback, and verifies that accurate data is

being collected. This rapid transfer to the home will have several benefits for infant and family; it will reduce medical costs, and increase bonding between infant and family. During this time period, the family may receive itinerant services from regional or community based nursing personnel, if there are health problems that are not manageable by the family. The quantity, nature, cost, and outcome of these services will become part of the data bank.

Once the infant's health problems are stabilized (or immediately if there are none) an infant education program can begin. This program will take many forms. "Crib toys" may present sequences of increasingly more complex visual stimuli and the infant may be reinforced for orienting responses, tracking, and then discrimination tasks. Response contingent toys, e.g., mobiles, will teach the child the relationship between a response and a preferred event. Gentle vibration on the spring loaded crib, soft music, mother's tape recorded voice and other events will bring the child into interaction with the environment. Continuous data monitoring will document the extent to which the infant responds to various stimuli. These data, overlaid on an activity cycle graph may show patterns of maximal learning time. Parents will be taught specific infant handling and instructional tasks. They may receive direct instruction in the home from an itinerant specialist whose visits, once initial training has occurred, are greatly reduced in frquency and are replaced by video monitored sessions which provide two-way communication (feedback). A team of interventionists will teach the infant, teach the parent to teach the infant, and then withdraw to a monitor role. Obviously, training may extend to other children, and members

of an extended family unit, or to neighbors who wish to support the family.

Computer technology will change to match the child's needs through the developmental years. When crib toys have been outgrown, they will be replaced by simple response panels, e.g., the match to sample panels. Later, simplified computer terminals may be used, and finally the young child will interact with standard terminals, however they are designed in the 22nd century. Thus, computer-child interaction will be a central and continuous part of the child's education. At certain stages, computers may perform functions that are possible now in only a rudimentary form. It is now possible for computers to talk and listen to humans. Research and development efforts in speech synthesis, computer grammars, and voice recognition will make it possible for computers to play a significant role in the infant/toddlers speech and language development. Computers will voice print emergent speech sounds, recreate those sounds as digited signals on tape, reproduce those sounds from memory, "model next appropriations to words" and shape speech sound production into meaningful utterances. In some cases, the computer and infant may interact in a rudimentary grammar which is then translated into the standard language of the culture, so that the computer functions as an interpreter. At later stages in the child's development, the computer may give directions, listen to vocal responses, and guide the child through beginning reading exercises.

Throughout the child's educational career daily data collection will occur. An extensive longitudinal profile will exist for each severely developmentally retarded individual. Since every intervention

will be recorded, it will be possible to immediately determine the effect of one intervention upon another. It should be possible to determine the effect of one intervention upon another. It should be possible to determine the rate of concept acquisition and observe changes in acquisition patterns over time. Then, when other interventions occur, their effect on the acquisition slope will be noted. Suppose that a child is administered a drug which alters seizure activity, but also reduces concept acquisition. Such an effect will be noted immediately and most probably, decision rules will be developed to determine when to change the intervention. Or, assuming parents will be taught the errorless learning instructional technologies now developed in rudimentary form, it will be possible to determine the extent to which they can assist their children to learn at high and error-free rates. If correct responding drops and errors occur in those tasks outside the domain of computers, the change in performance will show up immediately. This change will signal the central monitoring agency to contact the appropriate interventionist, who may first observe parent-child interaction from a remote location, suggest remedial strategies, monitor data; and if no change occurs, visit the home for a closer analysis of the problem.

SUMMARY

In this future view, education is considered a lifelong experience; again, providing data to research teams who work constantly to increase the effectiveness of procedures. In the culture of the future the home centered "electronic" cottage, located in communities where high technology information management, cooperative home and child management, and individual and group manual labor are carried out within the rhythm

of an individual living unit, the life chances of the severely developmentally retarded infant should be greatly increased. The immediate, intensive, and sophisticated intervention systems should enhance or elaborate the person's response repertoire to a level only dreamed of today. As the child grows in the community of the future, he should experience support from a "family" that extends into the community. Some of that family may care for him for short periods, a voluntary "respite" contribution to assist the natural parents. In some instances, the child may require such intensive intervention that long-term tutorial support is provided in the home, but only rarely would a "school" program be necessary. Similarly, for severely handicapped adults, the extended family unit may provide independent living at home or in future versions of today's group homes. Nowhere in this future view is there a vestige of the warehousing institutions which manage to perpetuate themselves today. In this future culture, where there is both humble and highly sophisticated work, there will surely be work opportunities for the severely developmentally retarded which are meaningful, satisfying and which contribute to individual and community sustenance. Though this culture may be very different from the culture of the 20th century, the potential for a normalized productive life style appears without question for those who today would be called developmentally retarded--and for the rest of us as well.